## This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:	
☐ BLACK BORDERS	
☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES	
☐ FADED TEXT OR DRAWING	
☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING	
☐ SKEWED/SLANTED IMAGES	
☑ COLOR OR BLACK AND WHITE PHOTOGRAPHS	
☐ GRAY SCALE DOCUMENTS	
☐ LINES OR MARKS ON ORIGINAL DOCUMENT	
☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY	

## IMAGES ARE BEST AVAILABLE COPY.

OTHER:

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 1 of 38

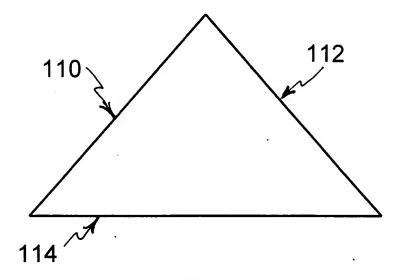
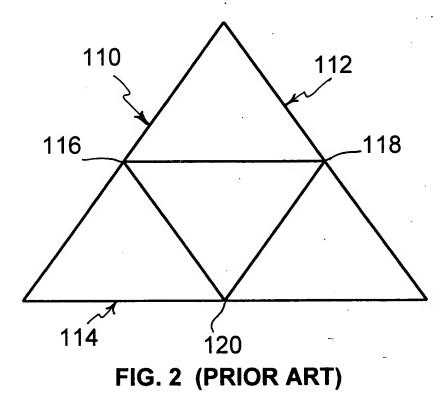


FIG. 1 (PRIOR ART)



Appl. No.: 10/022,871

Art Unit: 1772

Inventor: Stephen L. LIPSCOMB, Ph.D.

Replacement Sheet

Sheet 2 of 38

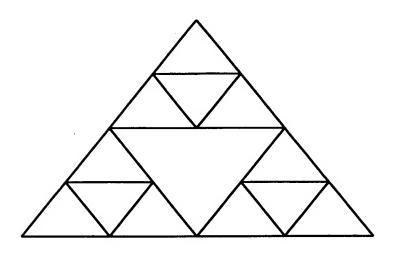


FIG. 3 (PRIOR ART)

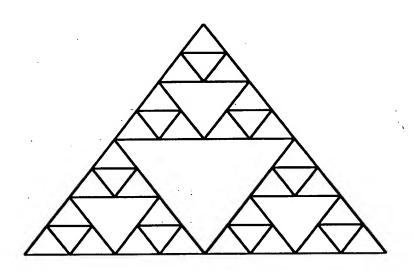


FIG. 4 (PRIOR ART)

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 3 of 38

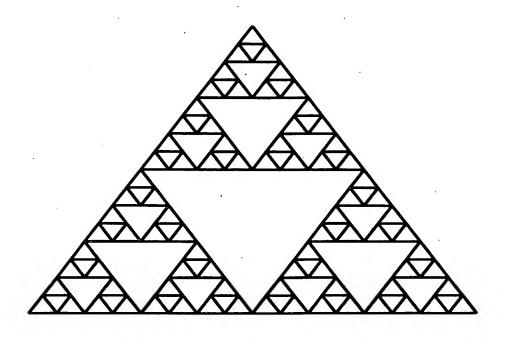


FIG. 5 (PRIOR ART)

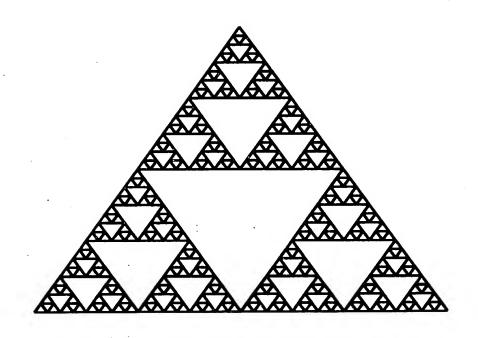


FIG. 6 (PRIOR ART)

Appl. No.: 10/022,871 Art Unit: 1772

Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet

Replacement Shee Sheet 4 of 38

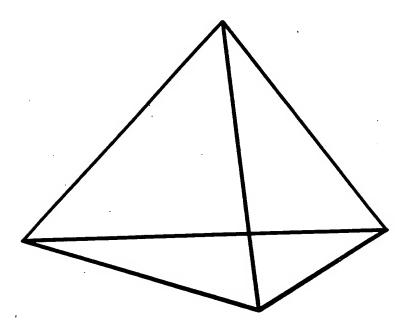


FIG. 7 (PRIOR ART)

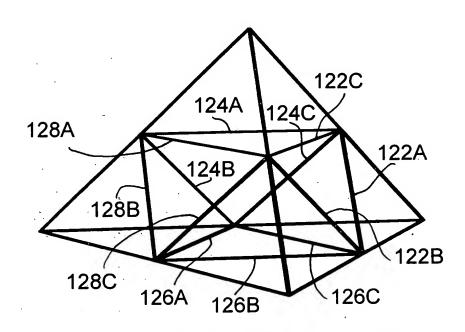


FIG. 8 (PRIOR ART)

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet

Sheet 5 of 38

FIG. 9 (PRIOR ART)

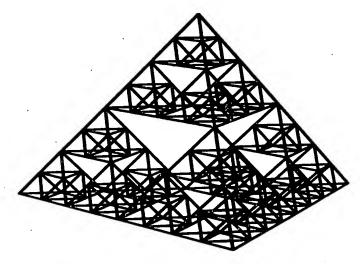


FIG. 10 (PRIOR ART)

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 6 of 38

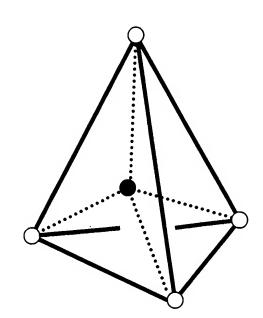


FIG. 10A (PRIOR ART)

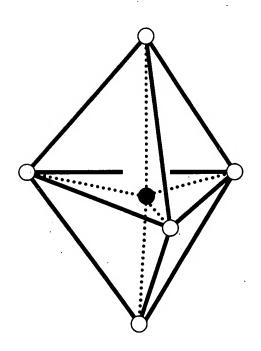


FIG. 10B (PRIOR ART)

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 7 of 38

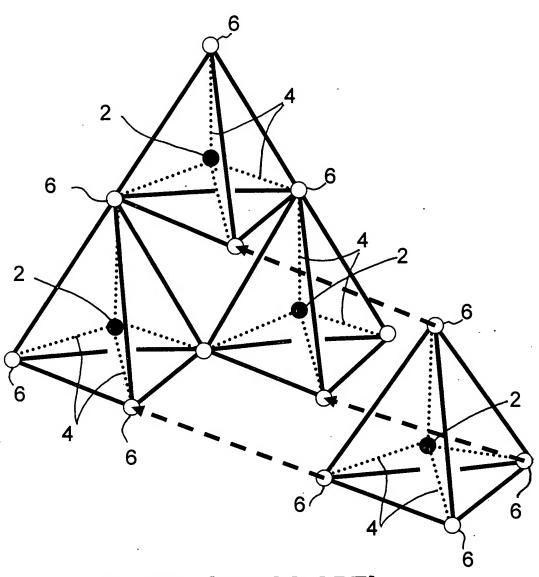


FIG. 10C (PRIOR ART)

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 8 of 38

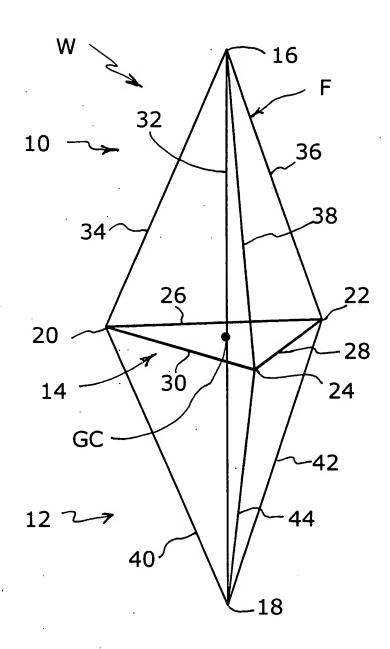


FIG. 11

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 9 of 38

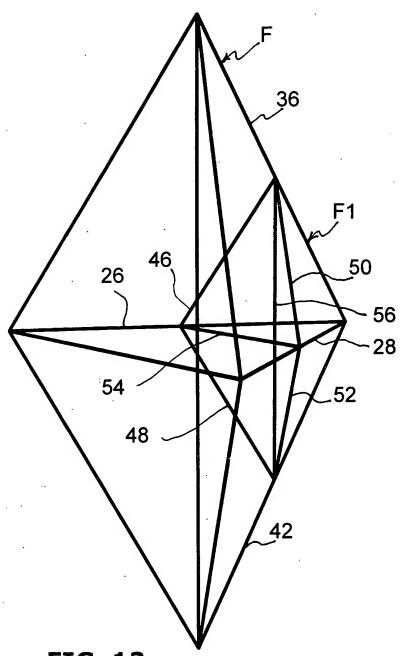
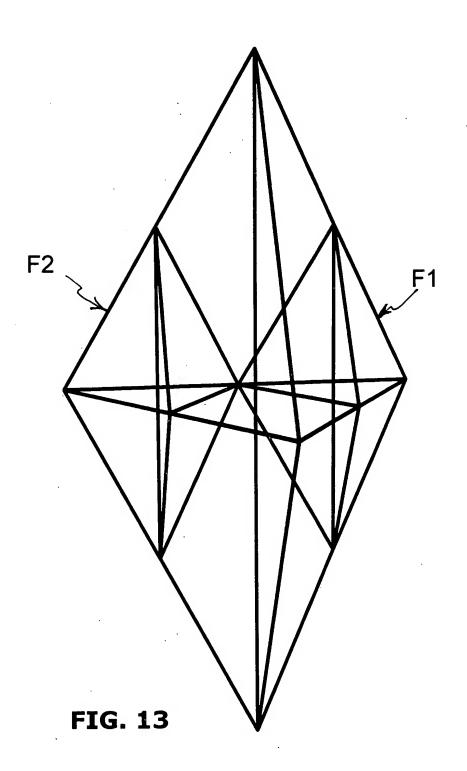
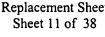


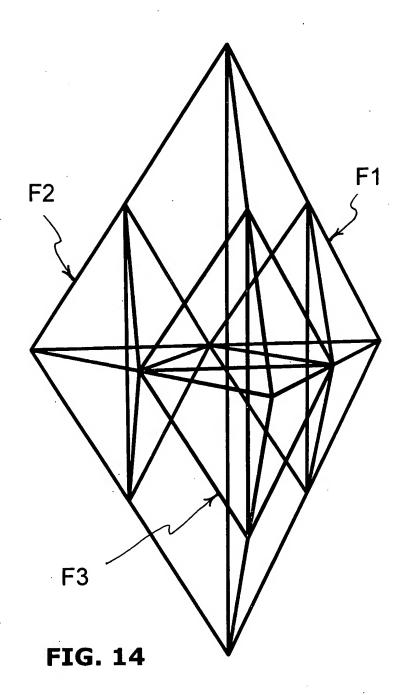
FIG. 12

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 10 of 38

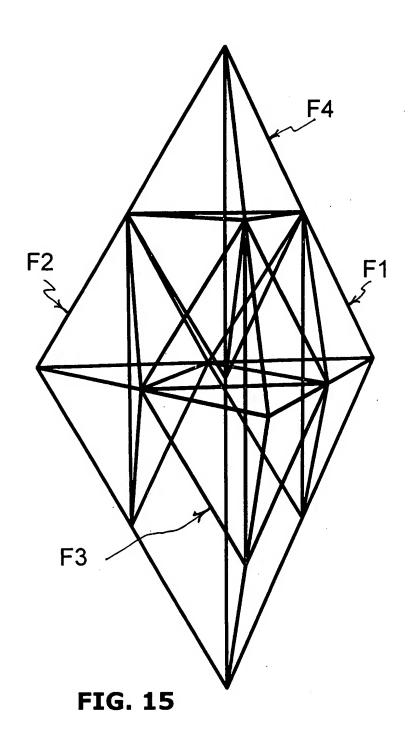


Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 11 of 38

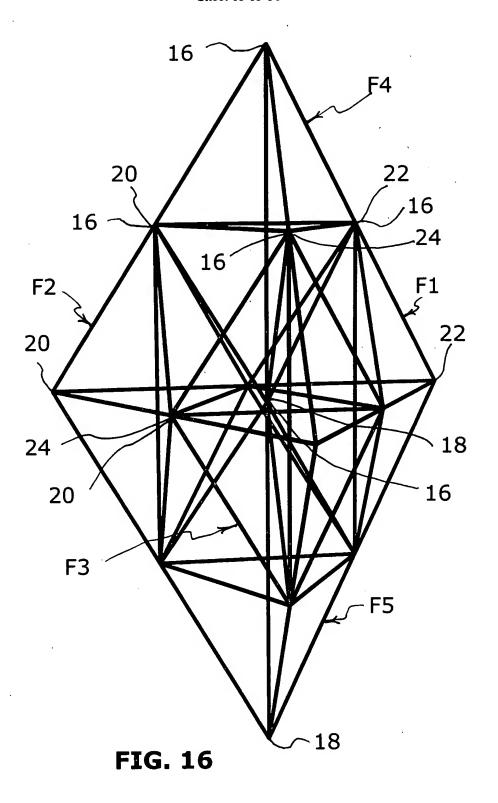




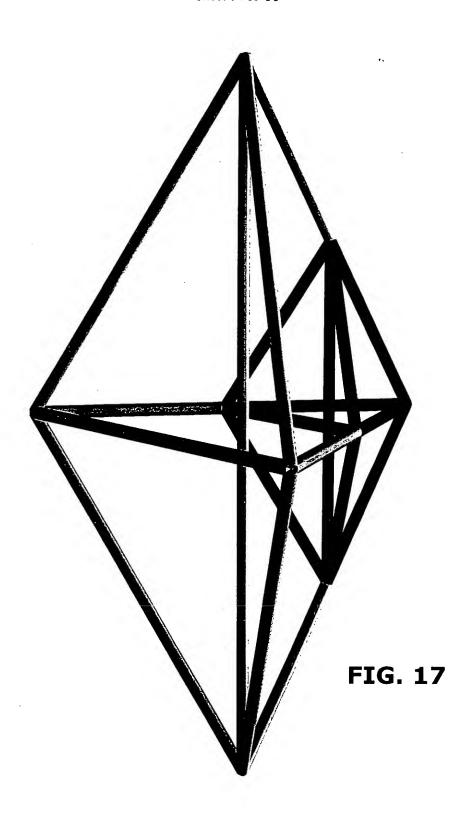
Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 12 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 13 of 38

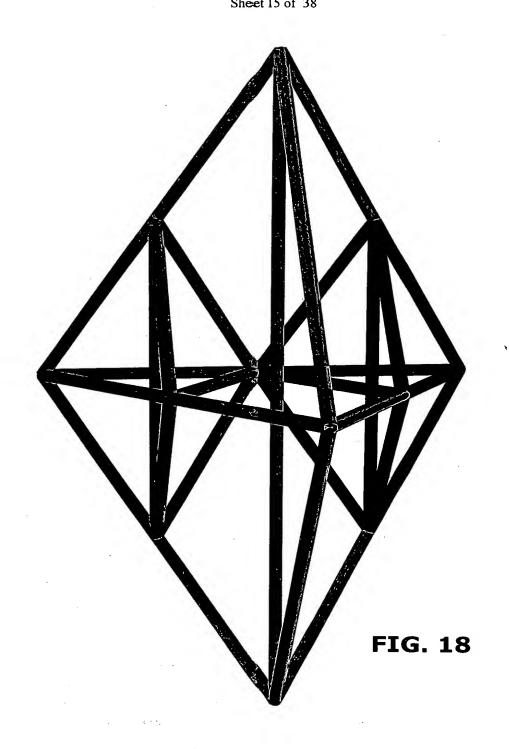


Appl. No.: 10/022,8/1 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 14 of 38

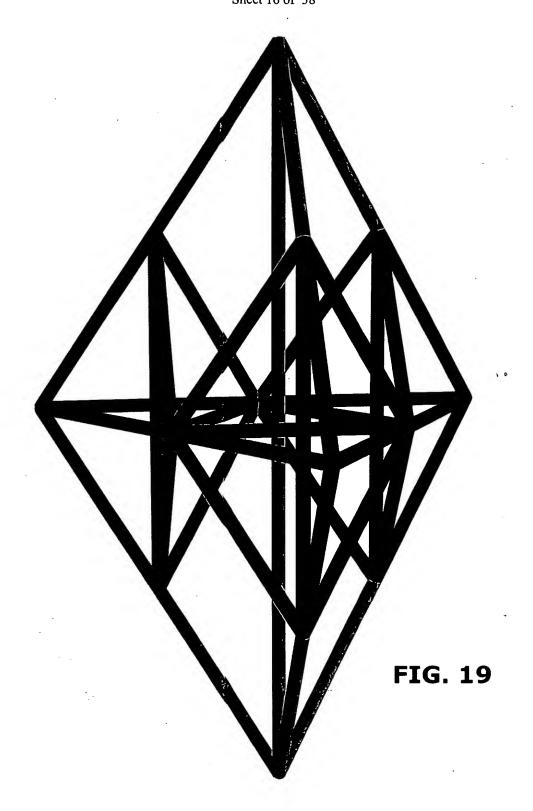


? :

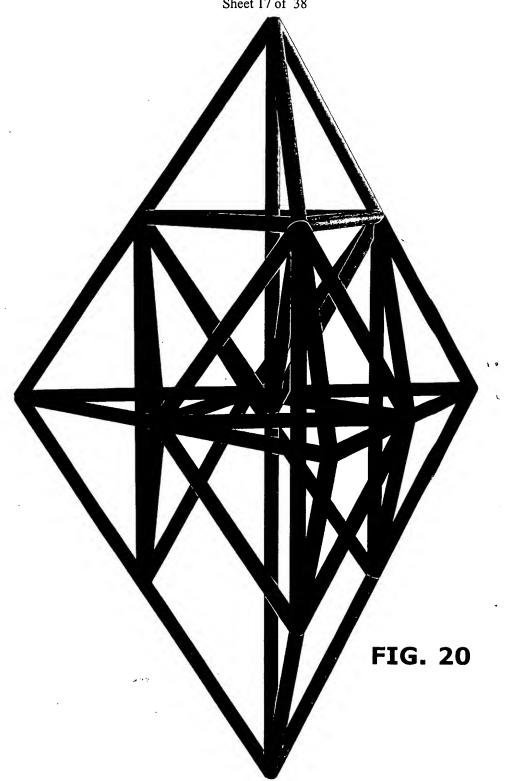
Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 15 of 38



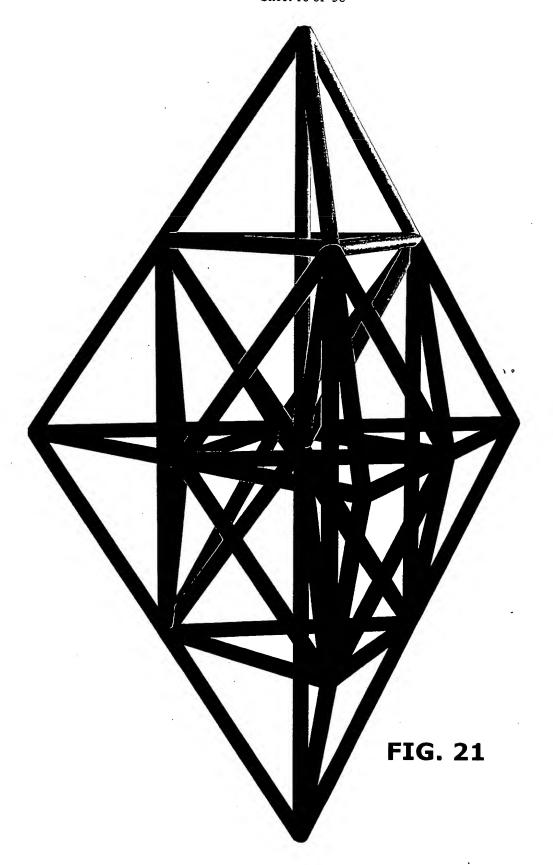
Appl. No.: 10/022,8/1
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 16 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 17 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 18 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 19 of 38

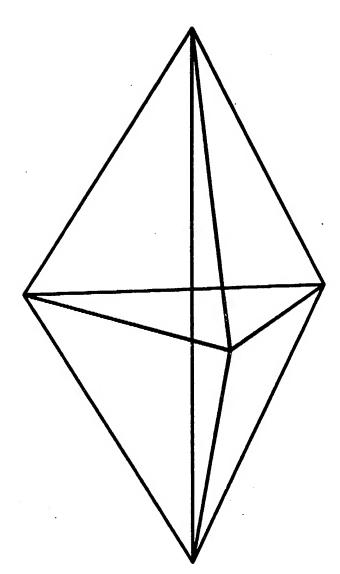
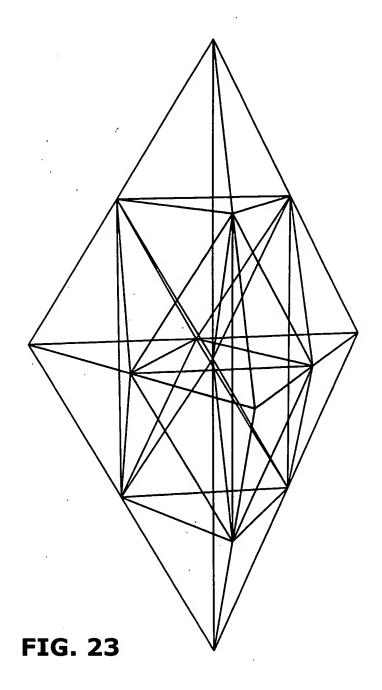


FIG. 22

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 20 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 21 of 38

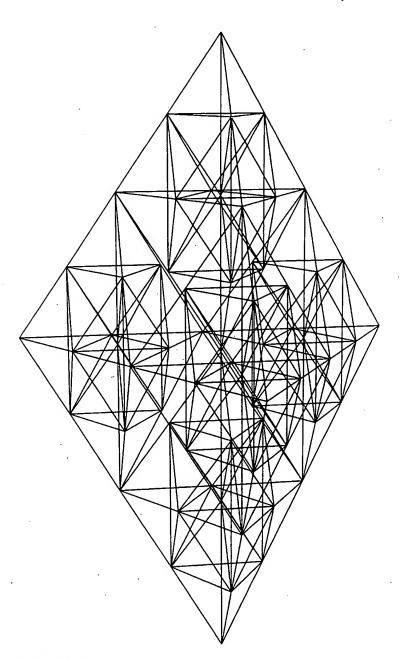
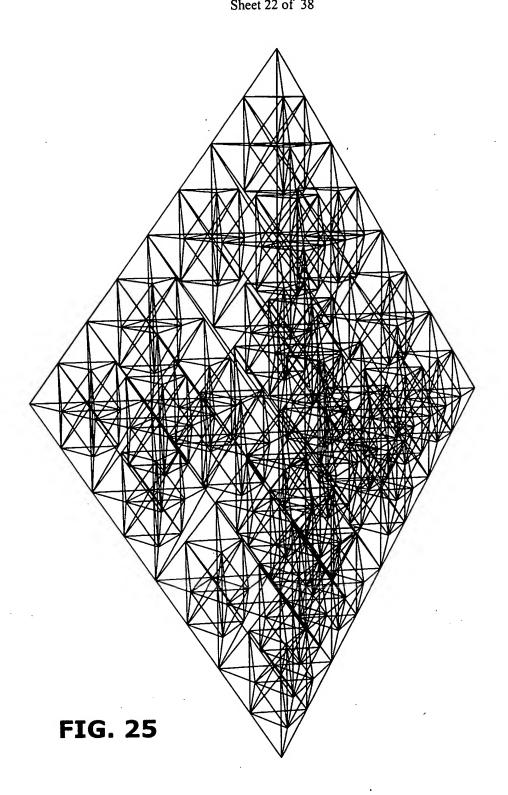


FIG. 24

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 22 of 38



Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 23 of 38

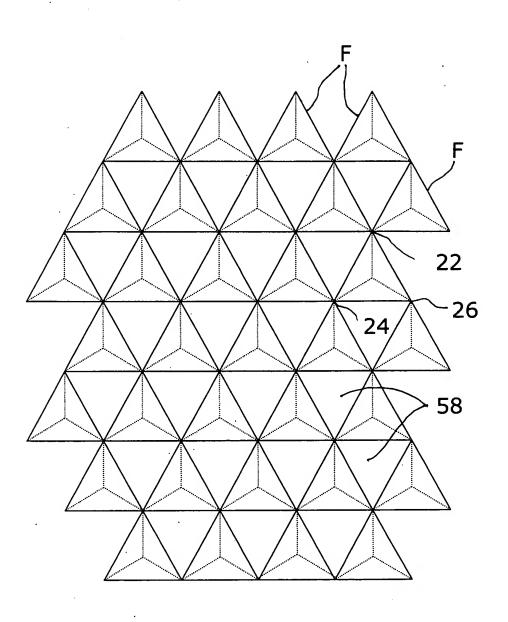


FIG. 26

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 24 of 38

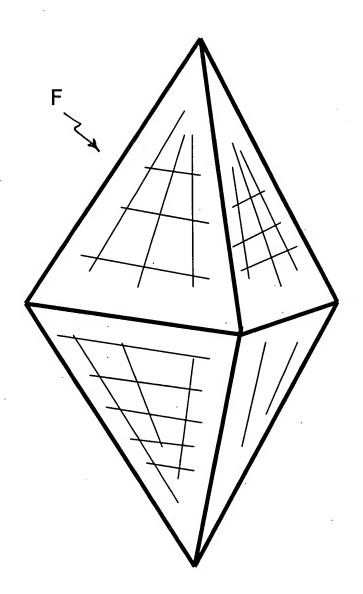
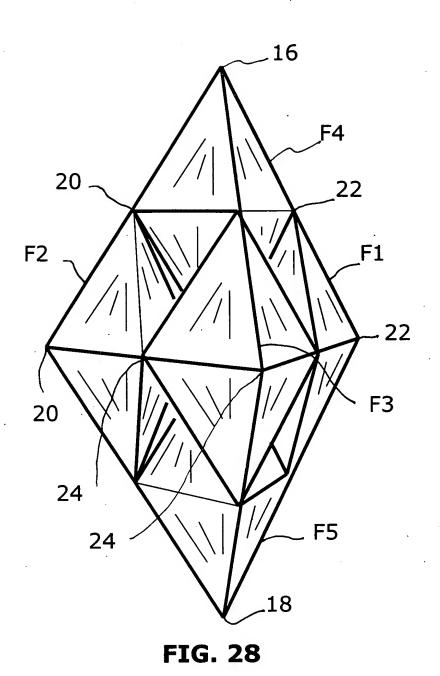


FIG. 27

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 25 of 38



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 26 of 38

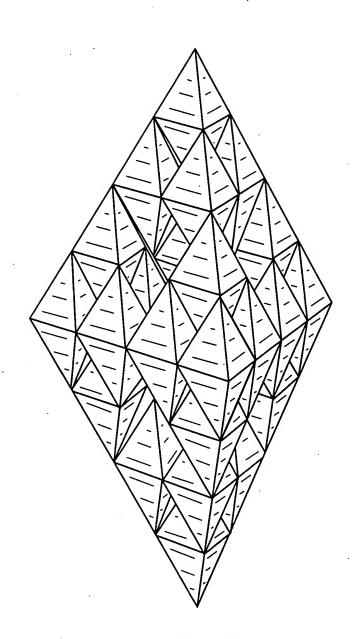


FIG. 29

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 27 of 38

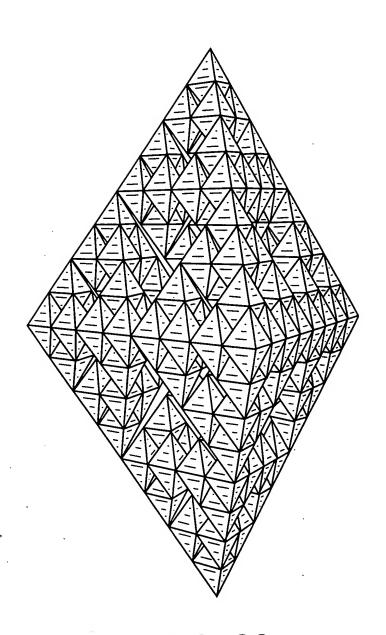


FIG. 30

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 28 of 38

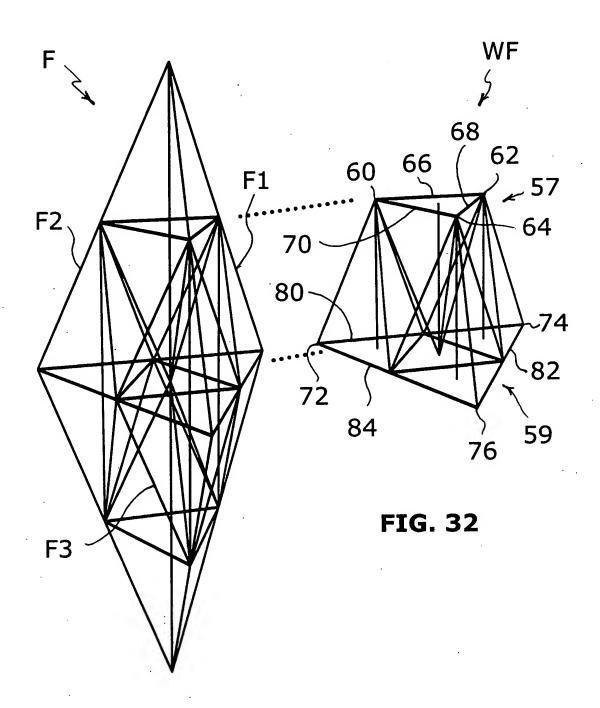
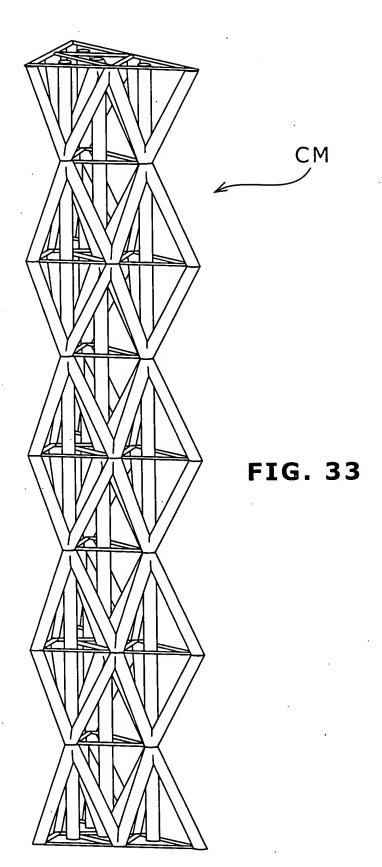


FIG. 31

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 29 of 38



Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 30 of 38

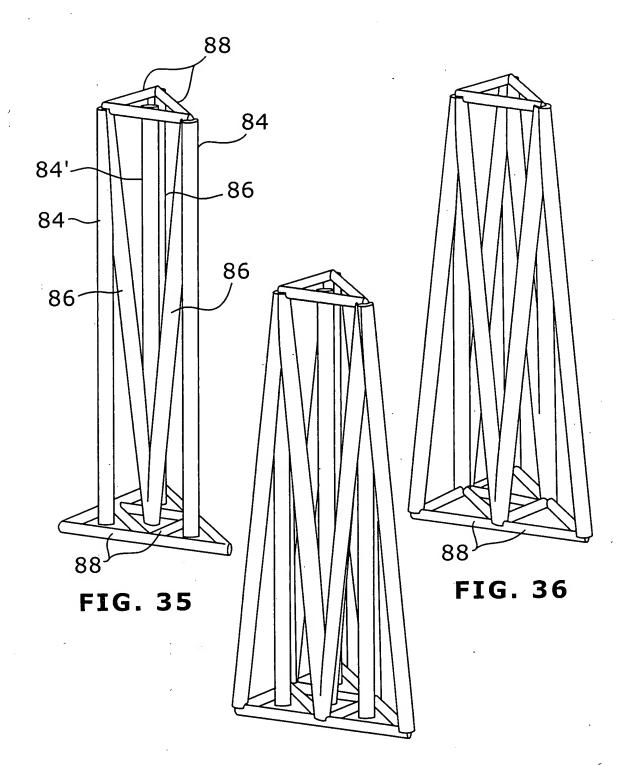


FIG. 34

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 31 of 38

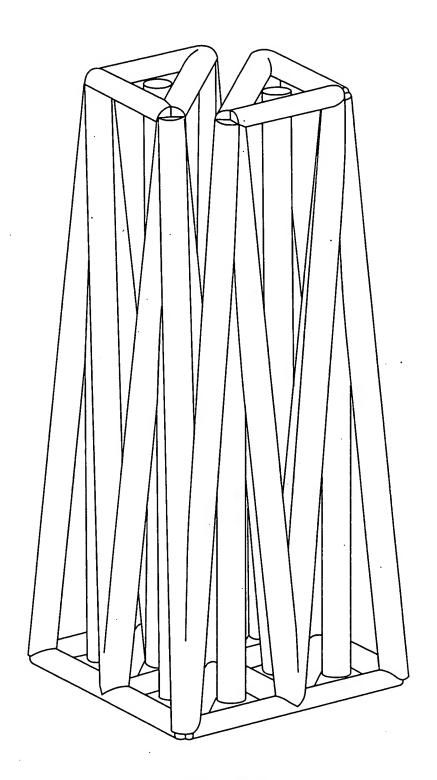


FIG. 37

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 32 of 38

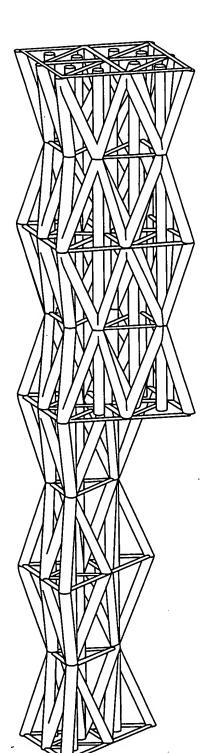


FIG. 38

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 33 of 38

FIG. 39

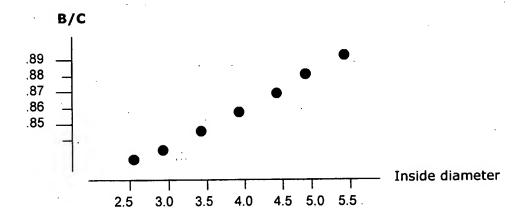


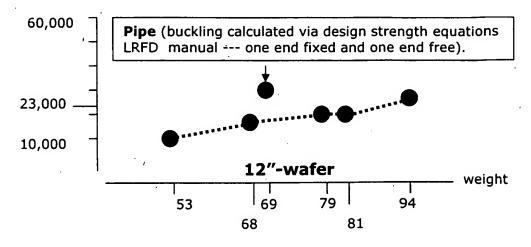
FIG. 40

Appl. No.: 10/022,871 Art Unit: 1772

Inventor: Stephen L. LIPSCOMB, Ph.D.

Replacement Sheet Sheet 34 of 38

## **Buckling** loads lbs



One A36 steel 3.5" OD 1/4" wall thickness pipe and comparable level-1 12"-wafer 4-web columns

FIG. 41

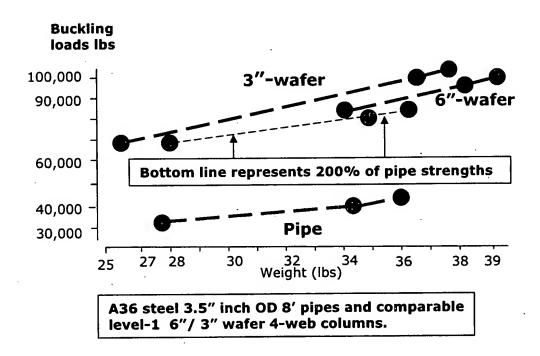


FIG. 42

Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 35 of 38

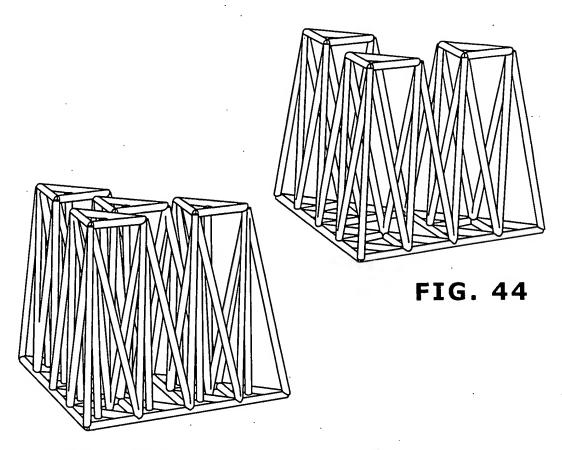
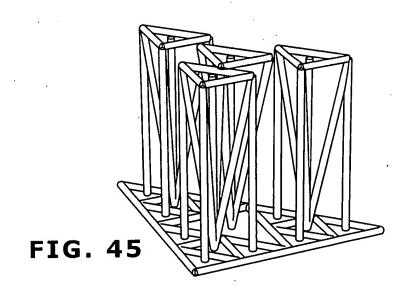


FIG. 43



Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 36 of 38

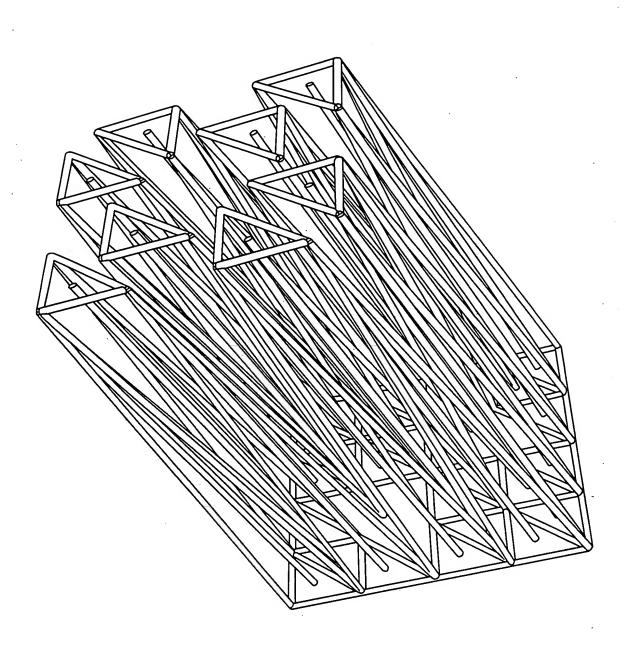
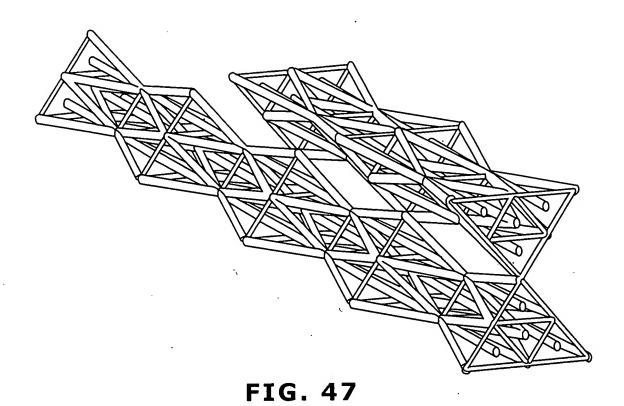


FIG. 46

Appl. No.: 10/022,871
Art Unit: 1772
Inventor: Stephen L. LIPSCOMB, Ph.D.
Replacement Sheet
Sheet 37 of 38



Appl. No.: 10/022,871 Art Unit: 1772 Inventor: Stephen L. LIPSCOMB, Ph.D. Replacement Sheet Sheet 38 of 38

